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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project h-1-6 Date Author

SUBJECT—

TITLE

REPORT OF PINE BEETLE SURVEYS ON THE CHELAN NATIONAL FOREST, WASHINGTON SUMMERS OF 1940 AND 1941

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February 27, 1942

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INDEX NO.—

U.S. GOVERNMENT PRINTING OFFICE 8—0742

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TABLE OF CONTENTS

	Page
Introduction	1
Results of the 1941 survey	2
Recent losses	2
General forest conditions	2
Recommendations	3
Summary	3
Table I. Description of the survey check plots	4
Table II. Summary of ponderosa pine check plot losses--summer survey of 1941	4
Table III. Summary of recent ponderosa pine losses on check plots	5
Table IV. Estimated 1939 and 1940 ponderosa pine insect-caused depletion	5
Figure I. 1940 infestation map	Appendix

INTRODUCTION

The tenth and eleventh pine beetle surveys in portions of the ponderosa pine stands of the Chelan National Forest, Washington, were completed during the periods of August 29-September 3, 1940 and October 24-28, 1941 respectively. These surveys, part of a regional cooperative project between the Forest Service, Indian Service, and Bureau of Entomology and Plant Quarantine, have the three following objectives: (1) To follow the infestation trends of forest insects, particularly those of the western pine beetle (Dendroctonus brevicomis Lec.); (2) to locate areas of epidemic infestation warranting direct control measures; and (3) to define the types of trees and areas most susceptible to insect attack which should be considered in forest management plans.

Two types of surveys were conducted. Intensive surveys were made on four 320-acre check plots (see table I) by three-man crews composed of the following personnel:

1940 crew - R. M. Ramstad, J. E. Weaver, and G. G. Black

1941 crew - F. E. Kinsey, G. W. Summerside, and H. A. Dahl

The former crew received detailed survey instructions at a ten-day training school held at Camp Sherman, Oregon for personnel of the Forest Service and Bureau crews. The 1941 crew was instructed in the field by Mr. A. J. Jaenicke of the Forest Service. Extensive or observational surveys over most of the 485,000 acres of commercial ponderosa pine were made by the writer during the period of August 28-30, 1940, but not in 1941. From these two surveys, estimates of the insect-caused ponderosa pine depletion for the forest as a whole were made.

RESULTS OF THE 1941 SURVEY

A summary of the 1941 check plot cruising data will be found in table II. This survey was made at a time when approximately 79 percent (Grant's curve) of the probable losses for the year were marked by the crew. Considering the plots as a group, the estimated volume losses for 1941 show a ratio of .74 to those of 1940, and the number of trees killed in 1941 will also be lower than that of 1940. Only one plot (Rendezvous) showed a tendency toward increased losses, but this increase will probably be very slight.

Practically all of these losses are attributable to the western pine beetle, with a small percentage of the total loss credited to the mountain pine beetle (Dendroctonus monticolae Hopk.) and to the California pine flathead (Melanophila californica VD). No direct control measures are necessary on the Chelan National Forest at this time.

RECENT LOSSES

Two previous reports by the writer, bearing the same titles as the present report but dated December 1938 and March 1940, summarize the insect loss data prior to 1939. Table III presents a summary of the ponderosa pine losses for the three-year period 1938-1940 inclusive. During this period an average of 52 board feet per acre per year and .64 percent of the stand per year have been killed on the four plots. This rate of loss is indicative of a light epidemic infestation, which, for the most part, has probably been offset by annual growth.

GENERAL FOREST CONDITIONS

As a result of the combined surveys, estimates of ponderosa pine depletion for the Chelan National Forest and the immediately adjacent stands of other ownerships have been made. These estimates for 1939 and 1940 are given by infestation areas in table IV and the general condition in 1940 is shown graphically by figure I.

Although these surveys uncovered no units of the Chelan National Forest needing urgent protection from forest insect depredations, consideration should constantly be given to the removal of as much beetle susceptible timber as possible in present or in contemplated timber sales. By so doing, the stands are left in a more vigorous condition and values in the over-mature timber crop are utilized before they are wasted by insect attacks. The Forest Insect Laboratory at Portland, Oregon offers cooperative assistance in determining the types of trees and the areas needing primary attention from a timber salvage or sanitation standpoint.

RECOMMENDATIONS

Because the data secured on the check plots become increasingly valuable with each year's survey, it is recommended that the check plots be covered again in 1942 and that another observational survey be made over the forest as a whole. The removal or salvage of the high value trees before they are attacked by insects should be carried out on all present and future timber sales.

SUMMARY

A brief review of pine beetle surveys during the summers of 1940 and 1941 in the ponderosa pine stands within and adjacent to the Chelan National Forest, Washington, is presented.

Nearly all of the ponderosa pine insect-caused mortality on this forest is the result of attacks by the western pine beetle. The losses have been continuous but during the past three years have not been serious.

Since the low of 1937, the losses on four check plots have increased slightly each year.

The estimated losses for 1941 are considerably lower than those of 1940.

No direct control work is necessary at this time.

Table I. Description of the survey check plots, Chelan National Forest, Washington

Infestation area	Check plots: Name	Location: T.	R.	Sec.	Elev. (feet)	Type	Site quality	Acres: Total	Pine timbered	Ponderosa pine (board feet): As of Jan. 1, 1940	Per acre
Methow	Eightmile Creek	36N	21E	9E/2	2,700-3,200	20.5	IV	320	320	2,980,000	9,300
	Rendezvous	36N	21E	31E/2	2,800-3,600	20.5	IV	320	320	3,000,000	9,400
	Loup Loup	33N	23E	10N/2	3,800-4,800	20.5	V	320	320	1,700,000	5,300
	Summit Road	32N	23E	1E/2	3,600-4,200	20.5	IV	320	320	3,400,000	10,600

Table II. Summary of ponderosa pine check plot losses--summer survey of 1941

Check plot	1940 losses: Trees: First cruise	Trees: Total	Volume (bd.ft.)	Date of cruise	1941 losses: Partial loss: Trees	Partial loss: Volume	Predicted total loss: Trees	Volume: Total	Volume: Per acre	Volume: % of stand	Ratio to 1939
Eightmile Creek	16	26	16,440	10/27/41	10	8,670	13	11,000	34	.37	.67
Rendezvous	10	13	10,700	10/28/41	11	7,820	14	13,000	40	.43	1.21
Loup Loup	34	57	29,000	10/24/41	32	9,760	41	13,000	41	.77	.45
Summit Road	38	45	19,480	10/25/41	24	14,540	31	19,000	60	.56	.97
Total	98	141	75,620		77	40,790	99	56,000	44	.50	.74

Table III. Summary of recent ponderosa pine losses on permanent check plots
Chelan National Forest, Washington

Check plot	1938 loss					1939 loss					1940 loss				
		Volume					Volume					Volume			
	Trees	Total	Per acre	% of stand	Ratio to 1937	Trees	Total	Per acre	% of stand	Ratio to 1938	Trees	Total	Per acre	% of stand	Ratio to 1939
Eightmile Creek	24	16,040	53	.50	.82	21	10,840	36	.40	.68	26	16,440	51	.55	1.51
Rendezvous	11	8,310	26	.27	1.03	14	13,010	41	.43	1.57	13	10,700	33	.36	.82
Loup Loup	28	11,780	37	.69	.71	50	24,110	75	1.41	2.05	57	29,000	90	1.70	1.20
Summit Road	23	17,330	54	.50	1.57	61	23,745	74	.69	1.37	45	19,840	62	.58	.83
Total	86	53,460	42	.52	.97	146	71,705	56	.65	1.34	141	75,620	59	.68	1.06

Table IV. Estimated 1939 and 1940 ponderosa pine insect-caused depletion
Chelan National Forest, Washington

Infestation area	Ponderosa pine		1939 losses				1940 losses			
		Volume		Volume				Volume		
	Acres	(M.bd.ft.)	Trees	M.bd.ft.	Per acre	% of stand	Trees	M.bd.ft.	Per acre	% of stand
Lake Chelan	83,000	322,000	2,300	800	10	.25	2,000	600	7	.19
Methow	326,000	2,090,000	21,700	13,000	42	.62	20,000	14,000	43	.65
Sinlahekin	76,000	495,000	2,000	700	10	.14	2,000	400	5	.10
FOREST TOTAL	485,000	2,907,000	26,000	14,500	30	.50	24,000	15,000	31	.52

LEGEND

WESTERN PINE BEETLE SURVEY

CHELAN NATIONAL FOREST, WASHINGTON

1940 INFESTATION

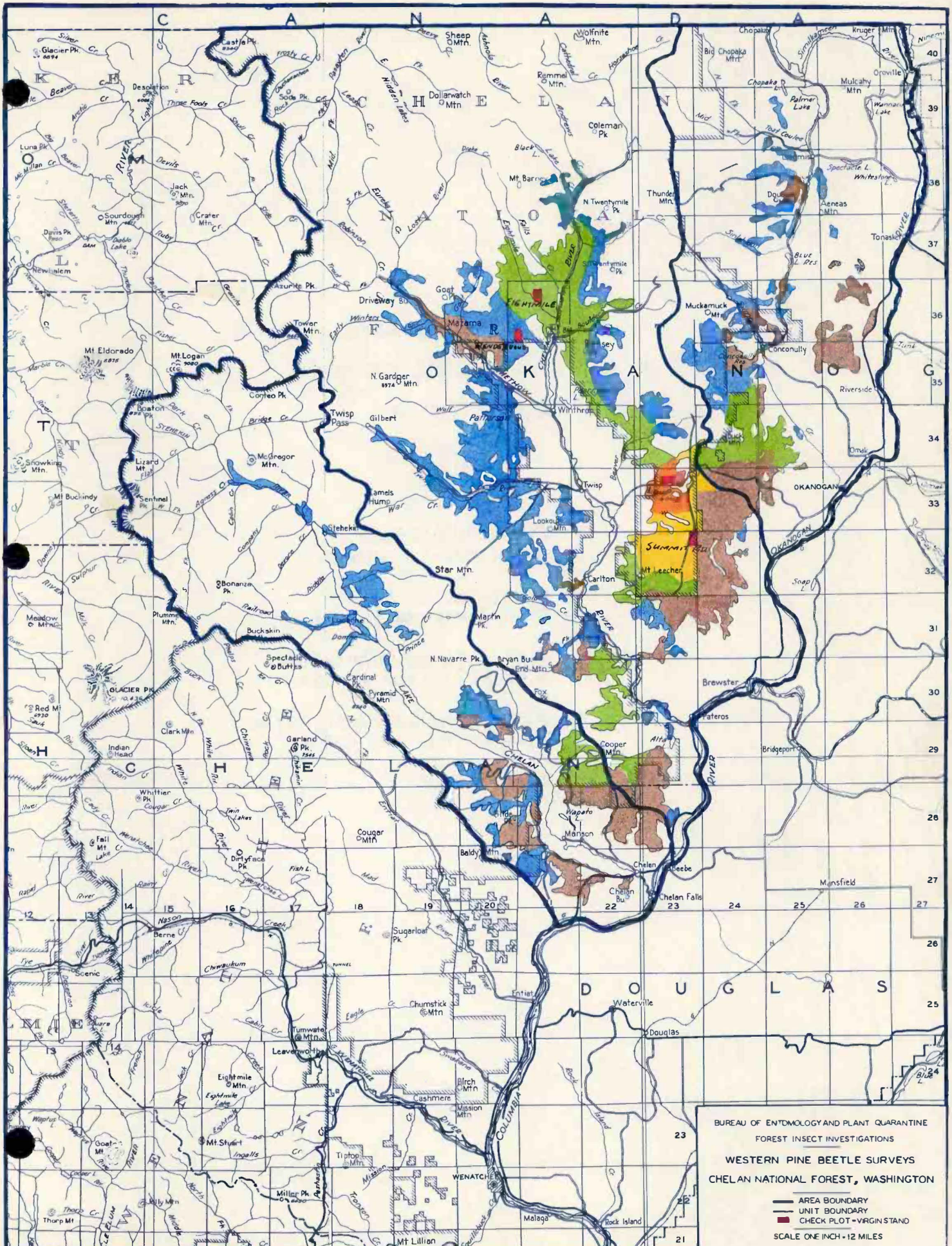
Normal infestation
0-25 trees per section

Normal infestation
25-50 trees per section

Light epidemic infestation
50-100 trees per section

Moderate epidemic infestation
100-200 trees per section

Cut-over areas


BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT INVESTIGATIONS
WESTERN PINE BEETLE SURVEYS
CHELAN NATIONAL FOREST, WASHINGTON
AREA BOUNDARY
UNIT BOUNDARY
CHECK PLOT - VIRGIN STAND
SCALE ONE INCH - 12 MILES
CANADA
OKANOGAN
CHELAN
DOUGLAS
KITTITAS
YAKIMA
LIGHTNING
SUMMIT RU
OKANOGAN
CHELAN
COLUMBIA
WENATCHEE
Sheep Mtn.
Wolfnite Mtn.
Dollarwatch Mtn.
Remmel Mtn.
Coleman Pk.
Mt. Barnes
N. Twentymile Pk.
Twentymile Pk.
Thunder Mtn.
Aeneas Mtn.
Muckamuck Mtn.
Conconully
Riverside
Omak
Okanogan
Brewster
Pateros
Bridgeport
Mansfield
Waterville
Douglas
Chelan
Chelan Falls
Manson
Wapato L.
Cooper Mtn.
Alta
Carlton
Mt. Leecher
Lookout Mtn.
Twisp
Winthrop
Patterson
Gilbert
Twisp Pass
N. Gardner
Goat Pk.
Driveway Butte
Tower Mtn.
Azurite Pk.
Mt. Eldorado
Mt. Logan
Cooney Pk.
Boston Pk.
Lizard Mt.
Showkina Mtn.
Mt. Buckindy
Sentinel Pk.
McGregor Mtn.
Bonanza Pk.
Star Mtn.
Martin Pk.
N. Navarre Pk.
Bryan Butte
Spectacle Buttes
Cardinal Pk.
Pyramid Mtn.
Plummer Mtn.
Meadow Mtn.
Red Mt.
Clark Mtn.
Indian Head
Garland Pk.
Whittier Pk.
Fall Mt.
Dirtyface Pk.
Cougar Mtn.
Baldy Mtn.
Sugarloaf Pk.
Berne
Nason Creek
Scenic
Chiwaukum
Tumwater Mtn.
Leavenworth
Eightmile Mtn.
Eightmile Lake
Mt. Stuart
Ingalls
Goat Mt.
Tiptop Mtn.
Miller Pk.
Thorp Mt.
Billy Mtn.
Chumstick Mtn.
Cashmere
Mission Mtn.
Birch Mtn.
Malaga
Rock Island
Mt. Lillian
Entiat
Entiat River
Chelan River
Columbia River
Methow River
Okanogan River
Twisp River
Chewuch River
Wenatchee River
Lake Chelan
Lake Wenatchee
Glacier Pk.
Desolation
Luna Pk.
Sourdough Mtn.
Crater Mtn.
Davis Pk.
Jack Mtn.
Newhalem
Diablo Lake
Ruby Mtn.
Castle Pk.
Frosty Cr.
Soda Pk.
Three Foods Cr.
Arctic Cr.
Beaver Cr.
Devils Cr.
Stehekin
Company Cr.
Agnes Cr.
Railroad Cr.
Buckskin Mtn.
Prince Cr.
Domke Cr.
Sulphur Cr.
Meadow Cr.
Phelps Cr.
Chiwawa River
White River
Napeequa River
Indian Cr.
Whitepine Cr.
Nason Cr.
Rainy Cr.
Fish L.
Mad River
Entiat River
Eagle Cr.
Cabin Cr.
Snowberry Cr.
Birch Cr.
Rock Island
Squilchuck Cr.
Tronson Cr.
Thorp Cr.
Middle Fk.
North Fk.
Ingalls Cr.
Eightmile Cr.
Frenchman Cr.
Mission Cr.
Peshastin Cr.
Ruby Cr.
Swamp Cr.
Fish Cr.
Mad Cr.
Rock Island
Palmer Lake
Toats Coulee
Spectacle L.
Whitestone L.
Blue Lk.
Tonasket
Chopaka Mtn.
Chopaka L.
Mulcahy Mtn.
Oroville
Kruger Mtn.
Similkameen River
Nine Mile
Omak
Soap L.
Fox
Alta
Beebe
Mansfield
Waterville
Douglas
Birch
Cashmere
Mission
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